Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) An apparatus for chemical polishing (CMP) of a wafer, comprising:

(a) a rotatable polishing platen ~~with an overlying~~ to support a polishing pad, ~~wetted with an abrasive slurry,~~ the platen having a hole formed therethrough and ~~be~~ rotatably mounted to a chassis;

(b) a ~~rotatable~~ polishing head for holding the wafer against the polishing pad; ~~, the wafer comprising a semiconductor substrate underlying an oxide layer~~; and,

(c) an endpoint detector, comprising,

(c1) ~~a laser interferometer~~ a stationary light source capable of generating a ~~laser~~ light beam directed towards the wafer from a side of the wafer contacting the polishing pad, ~~and detecting light reflected from the wafer, and~~

(c2) a window disposed adjacent to ~~a~~ the hole formed through the platen, the window rotating with the platen and intermittently providing a pathway for the ~~laser~~ light beam to impinge on the wafer ~~at least~~ during at least a part of a period of time when the wafer overlies the window, and

(c3) a stationary detector to receive light from the light beam reflected by the wafer through the window.

2. (Currently Amended) The apparatus of Claim 1, wherein the window comprises:

an insert mounted within the ~~platen~~ hole in the platen, the insert being transmissive to the ~~laser~~ light beam.

3. (Currently Amended) The apparatus of Claim 2, wherein ~~:~~ an upper surface of the insert protrudes above a surface of the platen and extends away from the platen a distance such that a gap is formed between the upper surface of the insert and the wafer whenever the

wafer is held against the polishing pad over the insert.

4. (Currently Amended) The apparatus of Claim 3, wherein ~~:~~ the gap between the wafer and the insert is ~~made as small as possible without allowing the insert to touch the wafer, and is~~ no more than approximately 1mm.

5. (Currently Amended) The apparatus of Claim 4, wherein ~~:~~ the gap between the wafer and the insert is 250 μm.

6. (Currently Amended) The apparatus of Claim 1, wherein the window comprises ~~:~~ a portion of the polishing pad, the portion being at least partially transmissive to the ~~laser~~ light beam.

7. (Currently Amended) The apparatus of Claim ~~1~~ 51, wherein the ~~window~~ light-transmitting material comprises ~~:~~ a plug formed in the polishing pad. ~~, the plug being highly transmissive to the laser beam.~~

8. (Currently Amended) The apparatus of Claim ~~1~~ 60, wherein ~~:~~ the hole ~~through~~ in the ~~platen~~ polishing pad support, and the window, are circular in shape.

9. (Currently Amended) The apparatus of Claim ~~1~~ 61, wherein ~~:~~ the hole ~~through~~ in the platen, and the window, are arc-shaped having a radius with an origin coincident with a center of rotation of the platen.

10. (Currently Amended) The apparatus of Claim ~~1~~ 59, wherein ~~:~~ the laser beam generated by the laser ~~interferometer~~ has a beam diameter at a point of impingement on the wafer which is significantly greater than the smallest diameter possible for ~~the~~ a wavelength ~~employed~~ of the laser beam.

11. (Currently Amended) The apparatus of Claim ~~1~~ 61, wherein the optical monitoring system ~~endpoint detector~~ further comprises ~~:~~ a position sensor for sensing when the ~~window~~ light-transmitting material is adjacent the wafer such that the ~~laser~~ light beam generated by the ~~laser interferometer~~ light source can pass unblocked through the ~~window~~ light-transmitting material and impinge on the wafer.

12 (Currently Amended) The apparatus of Claim 11, wherein the position sensor comprises:

(a) a flag attached along a portion of the periphery of the platen and extending radially outward therefrom; and,

(b) an optical interrupter-type sensor mounted to the chassis at the periphery of the platen and capable of producing an optical beam which causes a signal to be generated for as long as the optical beam is interrupted by the flag; and wherein,

(c) the flag is attached to the periphery of the platen in a position such that the optical beam is interrupted by the flag ~~thereby producing the signal from the sensor whenever~~ when the ~~laser~~ light beam can ~~be made to~~ pass unblocked through the window and impinge on the wafer.

13. (Currently Amended) The apparatus of Claim 11, wherein:

(a) the ~~laser interferometer~~ optical monitoring system comprises means for producing a detection signal whenever light reflected from the wafer is detected;

(b) the position sensor comprises means for outputting a sensing signal whenever the ~~window~~ light-transmissive material is adjacent the wafer such that the ~~laser~~ light beam generated by the ~~laser interferometer~~ light source can pass unblocked through the ~~window~~ light-transmissive material and impinge on the wafer; and,

(c) the ~~endpoint detector~~ optical monitoring system further comprises data acquisition means connected to the ~~laser interferometer~~ detector and position sensor for sampling the detection signal from the ~~laser interferometer~~ detector for the duration of the sensing signal from

the position sensor, the data acquisition means comprising a means for outputting a data signal representing the sampled detection signal.

14. (Currently Amended) The apparatus of Claim ~~13~~ 51, wherein the optical monitoring system includes a data acquisition means that comprises:

(a) means for sampling a detection signal output from the detector;

(b) means for integrating the sampled detection signal ~~from the laser interferometer~~ over a predetermined period of time; and ~~wherein, (b)~~

(c) ~~the~~ outputting means to output ~~outputs~~ a data signal representing the integrated samples of the detection signal.

15. (Currently Amended) The apparatus of Claim ~~13~~ 62, wherein the optical monitoring system includes a data acquisition means ~~further~~ that comprises:

(a) means for sampling ~~the~~ a detection signal output from the ~~laser interferometer~~ detector during each complete revolution of the platen, the detection signal being sampled in each complete revolution over a sample time;

(b) means for integrating each sample of the detection signal over the sample time to produce and integrated value corresponding to each sample;

(c) means for storing each integrated value;

(d) means for computing a cumulative sample time after each complete revolution of the platen, the cumulative sample time being the summation of the sample times associated with each sample of the detection signal;

(e) means for comparing the cumulative sample time to a desired minimum sample time; and

(f) means for transferring the stored integrated values from the storing means to means for calculating a summation thereof whenever the cumulative sample time equals or exceeds the predetermined minimum sample time; and ~~wherein,~~

(g) ~~the~~ outputting means ~~comprises means~~ for outputting a data signal representing a series of the integrated value summations from the summation means.

16. (Currently Amended) The apparatus of Claim ~~13~~ 62, wherein the data signal output by the outputting means is cyclical, and wherein the apparatus further comprises an endpoint detector ~~further comprises~~ including:

(a) means for counting a number of cycles exhibited by the data signal;

(b) means for computing a thickness of material removed during one cycle of the data signal from the wavelength of the ~~laser~~ light beam and the index of refraction of ~~the~~ an oxide layer of the wafer;

(c) means for comparing a desired thickness of material to be removed from the oxide layer, to a removed thickness comprising a product of the number of cycles exhibited by the data signal from the counting means and the thickness of material removed during one cycle from the computing means; and,

(d) means for terminating ~~the CMP~~ polishing whenever the removed thickness equals or exceeds the desired thickness of material to be removed.

17. (Currently Amended) The apparatus of Claim ~~13~~ 62, wherein the data signal output by the outputting means is cyclical, and wherein the apparatus further comprises an endpoint detector ~~further comprises~~ including:

(a) means for counting a number of occurrences of a portion of a cycle exhibited by the data signal;

(b) means for computing a thickness of material removed during the portion of the cycle of the data signal from the wavelength of the ~~laser~~ light beam and the index of refraction of ~~the~~ an oxide layer of the wafer;

(c) means for comparing a desired thickness of material to be removed from the oxide layer, to a removed thickness comprising a product of the number of occurrences of the

portion of the cycle exhibited by the data signal from the counting means and the thickness of material removed during the portion of the cycle from the computing means; and,

(d) means for terminating ~~the CMP~~ polishing whenever the removed thickness equals or exceeds the desired thickness of material to be removed.

18. (Currently Amended) The apparatus of Claim ~~13~~ 62, wherein the data signal output by the outputting means is cyclical, and wherein the data signal output by the outputting means is cyclical, and wherein the apparatus further comprises an endpoint detector ~~further comprises~~ including:

(a) means for measuring the time required for the data signal to complete on of (i) a prescribed number of cycles, or (ii) a prescribed portion of one cycle, after each occurrence thereof;

(b) means for computing a thickness of material removed during the time measured by the measuring means from the wavelength of the ~~laser~~ light beam and the index of refraction of ~~the~~ an oxide layer of the wafer;

(c) means for calculating a rate of removal, said calculating means dividing the thickness of material removed by the time measured obtained from the measuring means;

(d) means for ascertaining a remaining removal thickness, said ascertaining means subtracting a cumulative thickness of material removed from a desired thickness of material to be removed from the oxide layer, said cumulative thickness of material removed being provided by a means for summing the thickness of material removed computed by the computing means after each occurrence of the one of (i) a prescribed number of cycles, or (ii) a prescribed portion of one cycle;

(e) means for establishing a remaining CMP time, said establishing means dividing the remaining removal thickness by the rate of removal; and,

(f) means for terminating ~~the CMP~~ polishing after the expiration of the remaining CMP time.

19. (Currently Amended) The apparatus of Claim ~~13~~ 62, wherein the wafer has an initially irregular surface topography ~~and is planarized during CMP,~~ and the data signal output by the outputting means is cyclical only after the wafer surface is planarized, and wherein the apparatus further comprises an endpoint detector ~~further comprises~~ including:

(a) means for detecting a cyclic variation in the data signal; and,

(b) means for terminating ~~the CMP~~ polishing whenever the detecting means detects the cyclic variation in the data signal.

20. (Currently Amended) The apparatus of Claim 19, wherein ~~:~~ the detecting means is capable of detecting a cyclical variation in the data signal within at most one cycle of a beginning of the cyclical variation in the data signal.

21. (Currently Amended) The apparatus of Claim ~~13~~ 62, wherein the wafer has an initially irregular surface topography, and the data signal output by the outputting means is cyclical only after the wafer surface is planarized, and wherein the apparatus further comprises an endpoint detector ~~further comprises~~ including:

(a) means for filtering the data signal to pass only a component of the data signal having the predetermined frequency;

(b) means for counting a number of cycles exhibited by the filtered data signal;

(c) means for computing a thickness of material removed during one cycle of the filtered data signal from the wavelength of the ~~laser~~ light beam and the index of refraction of ~~the~~ an oxide layer of the wafer;

(d) means for comparing a desired thickness of material to be removed from the oxide layer, to a removed thickness comprising a product of the number of cycles exhibited by the filtered data signal from the counting means and the thickness of material removed during one cycle from the computing means; and,

(e) means for terminating ~~the CMP~~ polishing whenever the removed thickness of material to be removed.

22. (Currently Amended) The apparatus of Claim ~~13~~ 62, wherein the wafer has an initially irregular surface topography, and the data signal ouput by the outputting means is cyclical only after the wafer surface is planarized, and wherein the apparatus further comprises an endpoint detector ~~further comprises~~ including:

(a) means for filtering the data signal to pass only a component of the data signal having the predetermined frequency;

(b) means for counting a number of occurrences of a portion of a cycle exhibited by the filtered data signal;

(c) means for computing a thickness of material removed during the portion of the cycle of the filtered data signal from the wavelength of the ~~laser~~ light beam and the index of refraction of ~~the~~ an oxide layer of the wafer;

(d) means for comparing a desired thickness of material to be removed from the oxide layer, to a removed thickness comprising a product of the number of occurrences of the portion of the cycle exhibited by the filtered data signal from the counting means and the thickness of material removed during the portion of the cycle from the computing means; and,

(e) means for terminating ~~the CMP~~ polishing whenever the removed thickness equals or exceeds the desired thickness of material to be removed.

23. (Currently Amended) The apparatus of Claim ~~13~~ 62, wherein the wafer has an initially irregular surface topography, and the data signal output by the outputting means is cyclical only after the wafer surface is planarized, and wherein the apparatus further comprises an endpoint detector ~~further comprises~~ including:

(a) means for filtering the data signal to pass only a component of the data signal having the predetermined frequency;

(b) means for measuring the time required for the filtered data signal to complete one of (i) a prescribed number of cycles, or (ii) a prescribed portion of one cycle, after each occurrence thereof;

(c) means for computing a thickness of material removed during the time measured by the measuring means from the wavelength of the ~~laser~~ light beam and the index of refraction of ~~the~~ an oxide layer of the wafer;

(d) means for calculating a rate of removal, said calculating means dividing the thickness of material removed by the time measured obtained from the measuring means;

(e) means for ascertaining a remaining removal thickness, said ascertaining means subtracting a cumulative thickness of material removed from a desired thickness of material to be removed from the oxide layer, said cumulative thickness of material removed being provided by means for summing the thickness of material removed computed by the computing means after each occurrence of the one of (i) a prescribed number of cycles, or (ii) a prescribed portion of one cycle;

(f) means for establishing a remaining CMP time, said establishing means dividing the remaining removal thickness by the rate of removal; and,

(g) means for terminating ~~the CMP~~ polishing after the expiration of the remaining CMP time.

24. (Currently Amended) The apparatus of Claim ~~1~~ 58, wherein ~~:~~ the laser beam has a wavelength in approximately the red light range.

25. (Currently Amended) A method for chemical mechanical polishing (CMP) of a wafer, ~~comprising a semiconductor substrate underlying an oxide layer,~~ the method comprising the steps of:

(a) holding the wafer in a ~~rotatable~~ polishing head against a polishing pad; ~~of an underlying rotatable polishing platen, the pad being wetted with an abrasive slurry;~~

(b) moving the polishing pad to polish the wafer;

(c) determining an endpoint whereat ~~the CMP~~ polishing is terminated, the determining step comprising the steps of,

~~(b1)~~ (c1) generating a ~~laser~~ stationary light beam directed towards the wafer from a side of the wafer contacting the polishing pad; ~~, the laser beam~~

(c2) intermittently passing the light beam through a window ~~disposed adjacent a hole formed through the platen~~ that moves with the polishing pad, the window intermittently providing a pathway for the ~~laser~~ light beam to impinge on the wafer ~~at least~~ during at least a part of a period of time when the wafer overlies the window, and,

~~(b2)~~ (c3) detecting light of the light beam reflected from the wafer through the window to a stationary detector.

26. (Currently Amended) The method of Claim ~~25~~ 66, wherein the step of generating a the laser beam comprises ~~the step of:~~ forming a beam diameter at a point of impingement on the wafer which is significantly greater than the smallest diameter possible for ~~the~~ a wavelength of the laser beam. ~~employed.~~

27. (Currently Amended) The method of Claim 25, wherein the step of determining ~~step~~ further comprises ~~the step of:~~ sensing when the window is adjacent the wafer such that the ~~laser~~ light beam can pass unblocked through the window and impinge on the wafer.

28. (Currently Amended) The method of Claim 27, wherein:

(a) the step of detecting ~~step~~ comprises ~~the step of~~ producing a detection signal whenever light reflected from the wafer is detected;

(b) the step of sensing ~~step~~ comprises ~~the step of~~ outputting a sensing signal whenever the window is adjacent the wafer such that the ~~laser~~ light beam ~~generated by the laser interferometer~~ can pass unblocked through the window and impinge on the wafer; and,

(c) the step of determining ~~step~~ further comprises ~~the~~ a step of data acquisition, the data acquisition step comprising,

(c1) sampling the detection signal ~~from the laser interferometer~~ for the duration of the sensing signal, and,

(c2) outputting a data signal representing the sampled detection signal.

29. (Currently Amended) The method of claim ~~28~~ 76, wherein the step of determining further comprises a step of data acquisition step ~~further comprises~~ that includes:

(a) integrating the sampled detection signal over a predetermined period of time; and wherein,

(b) the step of outputting ~~step~~ comprises outputting a data signal representing the integrated samples of the detection signal.

30. (Currently Amended) The method of Claim ~~28~~ 76, wherein the determining step further comprises a step of data acquisition step ~~further comprises~~ that includes:

(a) sampling the detection signal output during each complete revolution of ~~the~~ a platen that supports the polishing pad, the detection signal being sampled in each complete revolution over a sample time;

(b) integrating each sample of the detection signal over the sample time to produce an integrated value corresponding to each sample;

(c) storing each integrated value;

(d) computing a cumulative sample time after each complete revolution of the platen, the cumulative sample time being the summation of the sample time associated with each sample of the detection signal;

(e) comparing the cumulative sample time to a desired minimum sample time; and

(f) transferring the stored integrated values whenever the cumulative sample time equals or exceeds the predetermined minimum sample time, and calculating a summation thereof; and wherein,

(g) the step of outputting ~~step~~ comprises outputting a data signal representing a series of the integrated value summations.

31. (Currently Amended) The method of Claim ~~28~~ 76, wherein the data signal is cyclical, and wherein the step of determining ~~step~~ further comprises: ~~the steps of:~~

(a) counting a number of cycles exhibited by the data signal;

(b) computing a thickness of material removed during one cycle of the data signal from ~~the~~ a wavelength of the ~~laser~~ light beam and the index of refraction of ~~the~~ an oxide layer of the wafer;

(c) comparing a desired thickness of material to be removed from the oxide layer, to a removed thickness comprising a product of the number of cycles exhibited by the data signal and the thickness of material removed during one cycle; and,

(d) terminating ~~the CMP~~ polishing whenever the removed thickness equals or exceeds the desired thickness of material to be removed.

32. (Currently Amended) The method of Claim ~~28~~ 76, wherein the data signal is cyclical, and wherein the determining step further comprises the steps of:

(a) counting a number of occurrences of a portion of a cycle exhibited by the data signal;

(b) computing a thickness of material removed during the portion of the cycle of the data signal from ~~the~~ a wavelength of the ~~laser~~ light beam and the index of refraction of ~~the~~ an oxide layer of the wafer;

(c) comparing a desired thickness of material to be removed from the oxide layer, to a removed thickness comprising a product of the number occurrences of the portion of the cycle exhibited by the data signal and the thickness of material removed during the portion of the cycle; and,

(d) terminating ~~the CMP~~ polishing whenever the removed thickness equals or exceeds the desired thickness of material to be removed.

33. (Currently Amended) The method of Claim ~~28~~ 76, wherein the data signal is cyclical, and wherein the step of determining step further comprises: ~~the steps of:~~

(a) measuring the time required for the data signal to complete one of (i) a prescribed number of cycles, or (ii) a prescribed portion of one cycle;

(b) computing a thickness of material removed during the time measured from ~~the~~ a wavelength of the ~~laser~~ light beam and the index of refraction of ~~the~~ an oxide layer of the wafer;

(c) calculating a rate of removal by dividing the thickness of material removed by the time measured;

(d) ascertaining a remaining removal thickness by subtracting the thickness of material to be removed from the oxide layer;

(e) establishing a remaining CMP time by dividing the remaining removal thickness by the rate of removal; and,

(f) terminating the CMP after the expiration of the remaining CMP time.

34. (Original) The method of Claim 33, wherein:

(a) steps (a) through (f) are repeated for each occurrence of the one of (i) a prescribed number of cycles, or (ii) a prescribed portion of one cycle;

(b) prior to step (d), the thickness of material removed after each occurrence of the one of (i) a prescribed number of cycles, or (ii) a prescribed portion of one cycle, is summed to produce a cumulative thickness of material removed; and,

(c) the ascertaining step comprises ascertaining the remaining removal thickness by subtracting the cumulative thickness of material removed from the desired thickness of material to be removed from the oxide layer.

35. (Currently Amended) The method of Claim ~~28~~ 76, wherein the wafer has an initially irregular surface topography ~~and is planarized during the CMP,~~ and the data signal is cyclical only after the wafer surface is planarized, and wherein the step of determining ~~step~~ further comprises: ~~the steps of:~~

(a) searching for a cyclic variation in the data signal; and,

(b) terminating ~~the CMP~~ polishing whenever the cyclic variation in the data signal is discovered.

36. (Currently Amended) The method of Claim 35, wherein the step of terminating ~~step~~ comprises ~~the step of:~~ terminating ~~the CMP~~ polishing within at most one cycle of a beginning of the cyclical variation in the data signal.

37. (Currently Amended) The method of Claim ~~28~~ 76, wherein the wafer has an initially irregular surface topography, and the data signal is cyclical only after the wafer surface is planarized, and wherein the step of determining ~~step~~ further comprises: ~~the steps of:~~

(a) filtering the data signal to pass only a component of the data signal having the predetermined frequency;

(b) counting a number of cycles exhibited by the filtered data signal;

(c) computing a thickness of material removed during one cycle of the filtered data signal from ~~the~~ a wavelength of the ~~laser~~ light beam and the index of refraction of ~~the~~ an oxide layer of the wafer;

(d) comparing a desired thickness of material to be removed from the oxide layer, to a removed thickness comprising a product of the number of cycles exhibited by the filtered data signal and the thickness of material removed during one cycle; and,

(e) terminating ~~the CMP~~ polishing whenever the removed thickness equals or exceeds the desired thickness of material to be removed.

38. (Currently Amended) The method of Claim ~~28~~ 76, wherein the wafer has an initially irregular surface topography, and the data signal is cyclical only after the wafer surface is planarized, and wherein the step of determining ~~step~~ further comprises: ~~the steps of:~~

(a) filtering the data signal to pass only a component of the data signal having the predetermined frequency;

(b) counting a number of occurrences of a portion of a cycle exhibited by the filtered data signal;

(c) computing a thickness of material removed during the portion of the cycle of the filtered data signal from ~~the~~ a wavelength of the ~~laser~~ light beam and the index of refraction of ~~the~~ an oxide layer of the wafer;

(d) comparing a desired thickness of material to be removed from the oxide layer, to a removed thickness comprising a product of the number occurrences of the portion of the cycle exhibited by the filtered data signal and the thickness of material removed during the portion of the cycle; and,

(e) terminating ~~the CMP~~ polishing whenever the removed thickness equals or exceeds the desired thickness of material to be removed.

39 (Currently Amended) The method of Claim ~~28~~ 76, wherein the wafer has an initially irregular surface topography, and the data signal is cyclical only after the wafer surface is planarized, and wherein the step of determining ~~step~~ further comprises: ~~the steps of:~~

(a) filtering the data signal to pass only a component of the data signal having the predetermined frequency;

(b) measuring the time required for the filtered data signal to complete one of (i) a prescribed number of cycles, or (ii) a prescribed portion of one cycle;

(c) computing a thickness of material removed during the time measured from ~~the~~ a wavelength of the ~~laser~~ light beam and the index of refraction of ~~the~~ an oxide layer of the wafer;

(d) calculating a rate of removal by dividing the thickness of material removed by the time measured;

(e) ascertaining a remaining removal thickness by subtracting the thickness of material removed from a desired thickness of material to be removed from the oxide layer;

(f) establishing a remaining CMP time by dividing the remaining removal thickness by the rate of removal; and,

(g) terminating ~~the CMP~~ polishing after the expiration of the remaining CMP time.

40. (Original) The method of Claim 39, wherein:

(a) steps (b) through (f) are repeated for each occurrence of the one of (i) a prescribed number of cycles, or (ii) a prescribed portion of one cycle;

(b) prior to step (e), the thickness of material removed after each occurrence of the one of (i) a prescribed number of cycles, or (ii) a prescribed portion of one cycle, is summed to produce a cumulative thickness of material removed; and,

(c) the ascertaining step comprises ascertaining the remaining removal thickness by subtracting the cumulative thickness of material removed from the desired thickness of material to be removed from the oxide layer.

41. (Currently Amended) The method of Claim 25, wherein the step of generating a laser beam comprises ~~the step of: employing~~ generating a laser beam having a wavelength in approximately the red light range.

42. (New) The apparatus of Claim 1, wherein the light source and detector provide an interfereometer.

43. (New) The apparatus of Claim 1, wherein the light source comprises a laser and the light beam is a laser beam.

44. (New) An apparatus for chemical mechanical polishing (CMP) of a wafer, comprising:

(a) a polishing pad support to hold a polishing pad and cause the polishing pad to move relative to the wafer;

(b) a polishing head for holding the wafer against the polishing pad; and

(c) an optical monitoring system, comprising,

(c1) a stationary light source to direct a light beam toward the wafer from a side of the wafer contacting the polishing pad,

(c2) a window that moves with the polishing pad, the window intermittently providing a pathway for the light beam to impinge on the wafer during at least a part of a period of time when the wafer overlies the window,

(c3) a stationary detector to receive reflections of the light beam from the wafer through the window.

45. (New) The apparatus of Claim 44, wherein the polishing pad support comprises a rotatable platen.

46. (New) The apparatus of Claim 45, wherein the window comprises a light-transmitting insert mounted in a hole through the platen.

47. (New) The apparatus of Claim 44, wherein the polishing pad support comprises a metal portion and the window comprises a hole through the metal portion of the polishing pad support.

48. (New) The apparatus of Claim 47, further comprising a polishing pad disposed on the platen, and wherein the window comprises a light-transmitting portion of the polishing pad.

49. (New) The apparatus of Claim 44, wherein the optical monitoring system further comprises:

a position sensor for sensing when the window is adjacent the wafer such that the light beam generated by the light source can pass unblocked through the window and impinge on the wafer.

50. (New) The apparatus of Claim 49, wherein the position sensor comprises:

(a) a flag attached along a portion of a periphery of a platen rotatably mounted to a chassis, the flag extending radially outward from the platen; and

(b) an optical interrupter-type sensor mounted to the chassis at the periphery of the platen and capable of producing an optical beam which causes a signal to be generated for as long as the optical beam is interrupted by the flag; and wherein,

(c) the flag is attached to the periphery of the platen in a position such that the optical beam is interrupted by the flag while the light beam can pass unblocked through the window and impinge on the wafer.

51. (New) An apparatus for chemical mechanical polishing (CMP) a wafer, said apparatus comprising;

a polishing pad support;

a polishing pad mounted on the polishing pad support, said polishing pad having at least a portion formed of a light-transmitting material;

a polishing head which during processing holds the wafer against the polishing pad; and

an optical monitoring system comprising a detector and a light source arranged to direct a light beam at least during part of the polishing operation through the light-transmitting material of said polishing pad so that the light beam impinges on the wafer and reflects back through the light-transmitting material to the detector and thereby provides for in-situ monitoring of the polishing process.

52. (New) The apparatus of Claim 51, wherein the light-transmitting material comprises polyurethane.

53. (New) The apparatus of Claim 51, wherein the light-transmitting material comprises a sheet.

54. (New) The apparatus of Claim 51, wherein the polishing pad comprises a polishing surface formed of opaque material, a bottom surface, and a window from the polishing surface to the bottom surface includes the light-transmitting material.

55. (New) The apparatus of Claim 54, wherein the light-transmitting material has a top surface substantially flush with the polishing surface.

56. (New) The apparatus of Claim 54, wherein the light transmitting material is positioned entirely between the polishing surface and the bottom surface.

57. (New) The apparatus of Claim 54, wherein the polishing pad includes a polishing layer including the light-transmitting material and a backing layer having an aperture aligned with the light-transmitting material.

58. (New) The apparatus of Claim 51, further comprising means for detecting a polishing endpoint from a signal generated by the optical monitoring system based on reflections of the light beam from the wafer sensed by the detector.

59. (New) The apparatus of Claim 51, wherein the light source comprises a laser and the light beam comprises a laser beam.

60. (New) The apparatus of Claim 51, wherein the polishing pad support has a hole formed therein, and the light-transmitting material is positioned over the hole.

61. (New) The apparatus of Claim 60, wherein the polishing pad support comprises a rotatable platen mounted to a chassis.

62. (New) The apparatus of Claim 51, further comprising data acquisition means for sampling a detection signal from the detector and a means for outputting a data signal representing the sampled detection signal.

63. (New) The method of Claim 25, wherein the light source and detector provide an interfereometer.

64. (New) The method of Claim 25, wherein the step of generating a light beam comprises generating a laser beam.

65. (New) The method of Claim 25, further comprising holding the polishing pad with a polishing pad support.

66. (New) The method of Claim 65, wherein the polishing pad support comprises a rotatable platen.

67. (New) The method of Claim 66, wherein the window comprises a light-transmitting insert mounted in a hole through the platen.

68. (New) The method of Claim 65, wherein passing the light beam through the window comprises passing the light beam through a hole in the polishing pad support.

69. (New) The method of Claim 25, wherein the polishing pad support comprises a metal portion and the window comprises a hole through the metal portion of the polishing pad support.

70. (New) The method of Claim 25, wherein the window comprises a light-transmitting portion of the polishing pad.

71. (New) A method for chemical mechanical polishing (CMP) a wafer on a polishing system, the method comprising the steps of:

holding a polishing pad with a polishing pad support, said polishing pad having at least a portion made of light-transmitting material;

holding the wafer on a polishing head against a polishing surface of the polishing pad;

polishing a surface layer on the wafer to remove an increasing amount thereof;

during at least a part of the polishing operation, directing a light beam through the light-transmitting material of the polishing pad so that the light beam impinges the wafer and reflects back through the light-transmitting material to an optical detector; and

determining a point to end polishing based on a signal from the detector.

72. (New) The method of claim 71, wherein the polishing pad support includes a hole formed therein, and the step of directing comprises directing the light beam through the hole.

73. (New) The method of Claim 71, wherein the step of polishing comprises rotating the polishing pad support and the polishing pad.

74. (New) The method of Claim 71, wherein the wafer comprises a semiconductor substrate.

75. (New) The method of Claim 74, wherein the wafer further comprises a surface layer on the substrate.

76. (New) The method of Claim 71, further comprising sampling a detection signal from the detector and outputting a data signal representing the sampled detection signal.